

**Testimony before the U.S.-China Economic and Security Review Commission**

**China's Energy Consumption and Opportunities for U.S.-China Cooperation to  
Address the Effects of China's Energy Use**

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I thank the Commission for the opportunity to share with you an example of excellent collaboration with a Chinese company, the China Huaneng Group, in the FutureGen project – the foremost project in the world to advance technology that will enable coal to be used with virtually no emissions, including the emission of carbon dioxide.

The FutureGen Project is a global public-private partnership formed to determine the technical and economic feasibility of generating electricity from coal with near-zero emissions, including carbon dioxide [CO<sub>2</sub>]. The FutureGen plant will cost US \$1.5 billion to develop. It will use cutting-edge technologies to generate electricity while capturing and permanently storing carbon dioxide deep beneath the earth. The plant will also produce hydrogen and byproducts for possible use by other industries.

***Private-Public Partnership***

The global scale of the energy system and the impact of CO<sub>2</sub> emissions make participation by a broad cross-section of international industrial, government, and other stakeholders a key requirement in developing strategies to reduce CO<sub>2</sub> emissions from the energy sector. For this reason FutureGen is being conducted through an international public-private partnership. The DOE leads the public side of the partnership and provides project oversight, chairs the intergovernmental steering committee, and with foreign governments, co-funds the project. The DOE is co-funding 74% of the project's \$1.5-billion cost. Currently, the governments of China, India and South Korea participate and co-fund the project with DOE. Other governments are likely to join the effort soon. The non-profit FutureGen Alliance (the Alliance) leads the private side of the partnership and is responsible for project management, implementation and co-funding 26% of the project cost.

Currently, there are 12 industrial companies who are members of the Alliance, representing some of the world's largest coal companies and electric utilities including: American Electric Power, Anglo American, BHP Billiton, the China Huaneng Group, CONSOL Energy Inc., E.ON U.S., Foundation Coal, PPL Corporation, Rio Tinto Energy America, Peabody Energy, Southern Company, and Xstrata Coal. As a group, these companies provide coal and produce electricity provide energy to tens of millions of

residential, business, and industrial customers on six continents including Asia, Australia, North America, South America, Europe, and Africa. U.S. member companies are responsible for more than 40% of the U.S. coal production and more than 20% of U.S. coal-fueled power generation capacity.

The Alliance is structured as a non-profit (501(c)(3)) organization in order to focus on technology advancement rather than profits. Alliance members contributing to the project do not receive any direct financial returns from participation in FutureGen. All revenue from the sale of power or any marketable byproducts will be returned to the non-profit entity, not the individual members, to support continued operations, research and development. This arrangement enables the Alliance members to focus on developing innovative approaches to generating electricity from coal in a cleaner way than ever envisioned. The non-profit structure will enable the Alliance to take more risk in experimenting with advanced technologies than would be the case if traditional measures of financial return were considered.

### ***The strategic importance of coal***

Coal is currently the world's leading fuel for electricity generation, and its use is projected to double by 2030. Within the United States, coal now fuels more than half of electricity generation. Coal is the major fuel for fast-growing economies such as China. Climate change and other energy concerns have created a pressing need to move coal-to-energy technologies onto a development pathway toward near-zero emissions. FutureGen, with its goal of demonstrating proving successful, permanent sequestration of CO<sub>2</sub> through its aggressive R&D program, is a linchpin of that pathway. The FutureGen plant and its operational performance will provide the basis for a new generation of reliable, near-emissions free, coal-fueled power plants that can compete economically with other generation technologies in a carbon-constrained world.

### ***The FutureGen Project***

FutureGen will be the first plant in the world to integrate coal gasification, electricity generation, emissions control, carbon dioxide capture and storage, and hydrogen production technologies. The 257-MW (nominal) FutureGen plant will use Integrated Gasification Combined Cycle (IGCC) technology, which will convert the solid energy in the coal into synthesis gas comprised of mostly hydrogen and carbon monoxide. The synthesis gas will react with steam to produce additional hydrogen and a concentrated stream of CO<sub>2</sub>. Hydrogen captured at the end of the gasification process will be used primarily to power turbines that will generate electricity. Additionally, hydrogen could be used in fuel cells, a combustion turbine and other hydrogen-based technologies. An important goal for the FutureGen plant is to capture 90 percent of the CO<sub>2</sub> and sequester over one-million tons of CO<sub>2</sub> annually. Deep saline formations, at depths greater than 3000 feet, are the target formation for CO<sub>2</sub> storage. DOE and the Alliance are interested in these formations because of the abundance of such formations throughout the world, making them a long-term viable solution for the wide-scale deployment of carbon sequestration.

While CO<sub>2</sub> storage in depleted oil wells has been widely used for enhanced oil recovery (EOR) since the 1970s – and is well understood – EOR opportunities are much less prevalent than deep saline formations. Because the Alliance wants to ensure that FutureGen is broadly replicable around the U.S. and the world, it is important to demonstrate CO<sub>2</sub> in this more widely occurring type of formation.

The R&D conducted at the FutureGen facility will provide a unique platform for testing new technologies in a commercial-scale environment. The Alliance's ultimate goal is to make these technologies commercially available so that clean power can be generated and CO<sub>2</sub> can be captured and permanently stored in a cost-effective way for future coal plants throughout the world.

Siting and building any power plant is a major undertaking that requires design, permitting and construction. The Alliance is operating under an aggressive timeline in order to break ground in 2009 and be operational in 2012. Substantial progress has been made since the public-private partnership was formalized on December 3, 2005 through the signing of a Cooperative Agreement by DOE and the Alliance. The FutureGen Alliance has completed the conceptual design and cost estimate for the project and is currently developing the design and specification for the major equipment. We will begin the procurement of long-lead items this summer. The Alliance has also made great progress in selecting the site for FutureGen. In 2006, the Alliance issued a Request for Proposals for parties interested in hosting the FutureGen plant, which seven states responded to with 12 proposals. A team of renowned U.S. and international scientists and engineers reviewed the proposals against a set of nearly 100 peer-reviewed, publicly-vetted criteria. These criteria reflected the environmental, technical, regulatory, and financial goals of the project. Based on a thorough evaluation, the FutureGen Alliance selected four candidate sites for further review, two in Illinois and two in Texas. The Alliance is supporting the Department of Energy in the Environmental Impact Statement as part of the National Energy Policy Act (NEPA) process, and will select the site for project deployment in late 2007.

### ***The China Huaneng Group***

The China Huaneng Group (CHNG) is one of the charter members of the Alliance. China Huaneng Group is one of the top ten power companies in the world and is the largest coal-based power generator in the People's Republic of China, representing about nine percent of China's generating capacity. The Huaneng Group's involvement in FutureGen signals an exciting step forward in international cooperation to meet long-term global energy challenges, promote a cleaner environment, and create solutions to address concerns about climate change. The involvement of China's largest coal-based generator is significant considering that China has the world's third-largest coal reserve base and uses coal to generate about 70 percent of its electricity.

As a member of the Alliance, the CHNG has a seat at the Board of Directors. This enables CHNG to participate in all Board meetings, provide guidance on the technical

and business direction of the Alliance, and vote on critical matters in accordance with the Alliance by-laws.

Because the Alliance is a non-profit (501(c)(3)) organization, Alliance members are not entitled to receive financial return or intellectual property associated with the project. However, the benefits of membership to CHNG and other participating companies are significant. Some of those benefits include:

- First-hand knowledge in the development of the world's first near-zero coal plant
- Opportunities to develop relationships with experts in the industry, including other Alliance members and equipment suppliers, and DOE officials
- Better understanding about the operation of the facility, including what equipment and systems work well and do not work well
- Improved public perception / good will from providing financial support to technology solutions towards reducing emission of CO<sub>2</sub> into the atmosphere while continuing to use low-cost and abundant coal.

I would like to conclude by sharing with you some personal observations about our relationship with our partners from CHNG:

- CHNG invited the Alliance members to conduct a Board meeting in China, and we took advantage of that offer in February 2006. The visit, which also included the opportunity to meet with several Government officials and Chinese R&D firms and to visit a Chinese gasifier, provided significant insight to Alliance Directors about the immense growth in China and the desire and important need for the Chinese energy industry to find ways to use coal more cleanly and economically.
- The CHNG representative on the Board has contributed as an equal Board member despite cultural differences, and his contributions to our deliberations have been meaningful.

In closing, I would like to say that developing technology-based solutions to global climate change is an issue that transcends all international borders. The FutureGen project has been successful in creating an Alliance of international companies and governments who are taking tangible steps to ensure that coal, the most abundant and secure fossil fuel in the world, can be used cleanly and efficiently. Projects such as FutureGen are expensive. No one company, or government, should be expected to develop such a project in a vacuum. As the FutureGen project continues down its pathway towards proving that near-zero emission coal plants can be built and operated safely, economically, and in an environmental compatible manner, private companies and governments throughout the world will be in a better position to replicate the technologies behind FutureGen because U.S. and foreign governments and the Alliance members collaborated in supporting this important project.

I thank you for this opportunity to speak before you, and I welcome the opportunity to respond to any questions.

